

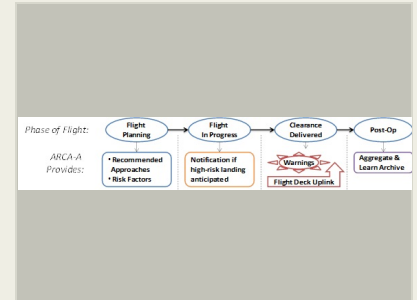
Automated Real-Time Clearance Analyzer (ARCA), Phase I

Completed Technology Project (2016 - 2016)



Project Introduction

The Automated Real-Time Clearance Analyzer (ARCA) addresses the future safety need for Real-Time System-Wide Safety Assurance (RSSA) in aviation and progressively more trusted autonomy as will be explored in NASA's SMART-NAS and SASO within the Airspace Operations and Safety Program (AOSP). ARCA builds on recent advances in probabilistic (Bayesian) network modeling and the rapid expansion of big data capabilities. The application of ARCA that we propose to develop, ARCA-A, performs safety analyses of approach clearances based on multiple sources of relevant real-time data, such as real-time aircraft data, weather data, past and current operations data, and crew data. ARCA-A provides intelligent risk assessment of clearances over the lifetime of the operation, from planning to clearance delivery. As it matures, ARCA can play a range of roles at increasing levels of autonomy and authority. Initially, once it has trained to the level of generating insight, it can be used to identify hot spots in the NAS or in a region (specific areas, procedures, aircraft types, or times of day when risks increase) on a daily or weekly review basis. Next, it could be deployed to air traffic managers, dispatchers, or other users with real-time operational oversight. With further integration, it could optionally display real-time informational warnings on ATC displays, flight displays, or dispatcher screens. Eventually, ARCA could play a foundational role in automated clearance selection and delivery. For research purposes, in this project we propose to design and begin development of a specific ARCA-A application. The primary focus of the research will be core algorithms, information integration, performance, and feasibility. ARCA is a promising new concept that represents a major step forward in aviation safety from static, forensic, manual methods toward real-time, prognostic, automated capabilities, the end result of which will be safer and more efficient operations.



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Table of Contents

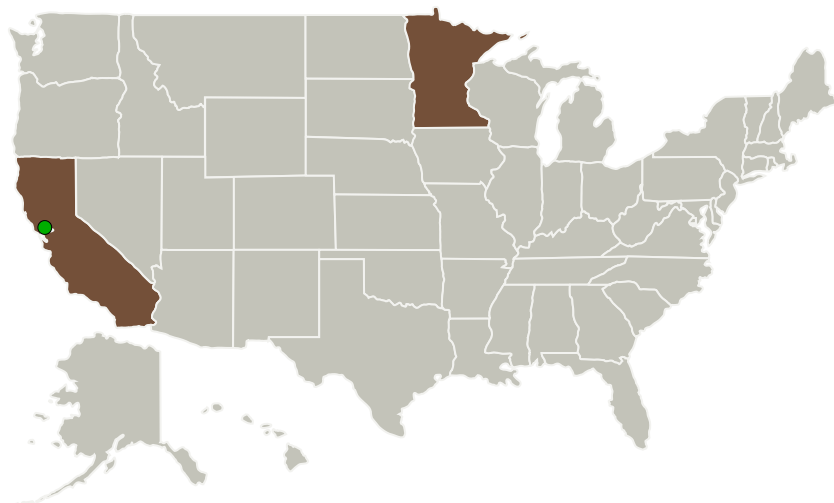
Project Introduction	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destinations	3

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Architecture Technology Corporation	Lead Organization	Industry	Eden Prairie, Minnesota
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Minnesota

Project Transitions

June 2016: Project Start

December 2016: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140385>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Architecture Technology Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

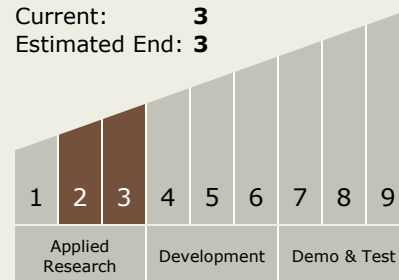
Carlos Torrez

Principal Investigator:

David Rinehart

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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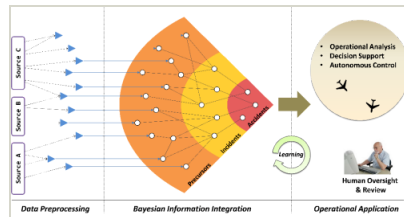


Images



Briefing Chart Image

Automated Real-Time Clearance Analyzer (ARCA), Phase I
(<https://techport.nasa.gov/image/137048>)



Final Summary Chart Image

Automated Real-Time Clearance Analyzer (ARCA), Phase I Project Image
(<https://techport.nasa.gov/image/133834>)

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System